

Appl. No. : 10/007,304
Filed : December 5, 2001

REMARKS

Applicants thank the Examiner for the courtesy extended to Applicants' representative in a telephone conference dated August 4, 2003. The amendments presented herein are in accordance with that telephonic interview. However, independent Claim 35 recites the features of former dependent Claim 38, and independent Claim 50 recites the features of former dependent Claim 42.

Applicants continue to submit that the claims are patentably distinct from the teachings of McTeer. For example, independent Claim 35 recites grain boundaries of the metal nitride layer being "stuffed with a metal compound of the reactive metal," which reactive metal is specified to be different from metal in the metal nitride layer. Independent Claim 50 even more specifically recites a sandwich arrangement of a first metal nitride, an intervening reactive metal layer, and a second metal nitride, again specifying that the grain boundaries of the first and second metal nitride layers are stuffed with a compound of a metal different from the metal nitride layers. Independent Claim 52 specifies titanium nitride having grain boundaries stuffed with aluminum oxide, and independent Claim 55 specifies a metal nitride having grain boundaries stuffed with silicon oxide.

Applicants submit that McTeer does not meet the limitations of the pending claims. In one embodiment, titanium aluminum nitride ($Ti_xAl_yN_z$) is employed as a barrier layer, with or without an oxidation step or with or without an overlying aluminum layer. In addition to failing to meet the limitations noted above, Applicants submit that this material cannot meet Applicants' Claim 35 nor Claim 50, since the layer of reactive metal would be the same as a metal in the metal nitride layer. Claim 55 is also not met by this embodiment because no silicon is disclosed in that embodiment.

Moreover, none of independent Claims 35, 50, 52 or 55 are met by the second embodiment in McTeer, wherein a barrier layer (metal nitride material selected from tantalum nitride, titanium nitride, tungsten nitride and titanium aluminum nitride, see column 17, lines 62-65) is overlain with an aluminum layer which then reacts to form an alloy with an overlying copper layer. See column 18, lines 3-27. Again, there is no teaching that the metal nitride has grain boundaries that are "stuffed with a metal compound of the reactive metal." In this case, if aluminum is considered the reactive metal, McTeer specifically teaches alloying aluminum with

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the overlying copper, and does not explicitly teach the aluminum reacting with anything in the grain boundaries of the metal nitride.

Moreover, the principles of inherency cannot be applied in this case. Inherency requires that the prior art *necessarily* achieves the claimed result. "Inherency, however, may not be established by probabilities or possibilities. The fact that a given thing *may* result from a given set of circumstances is not sufficient." *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (CCPA 1981).

Nevertheless, to facilitate prosecution of the present application, Applicants have amended the claims as set forth hereinabove. Applicants respectfully submit that the claims are in condition for allowance and request the same.

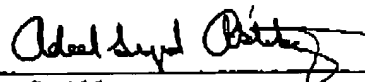
If, however, some issue remains that the Examiner feels may be addressed by Examiner Amendment, the Examiner is cordially invited to call the undersigned for authorization.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

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